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## NON-CONFIDENTIAL TECHNOLOGY DISCLOSURE

### Novel Cleavable Block Copolymers and Functionalized Nanoporous Materials

Lead Inventor: Sankaran Thayumanavan, Ph.D.

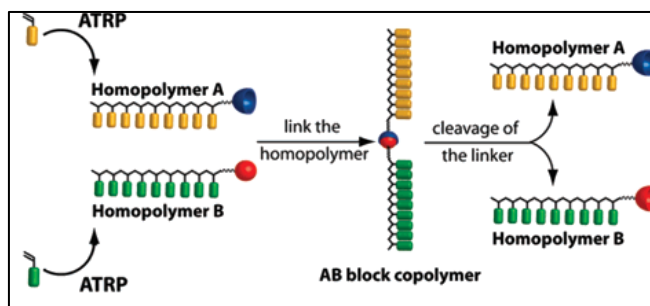
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#### TECHNOLOGY DESCRIPTION

Dr. Thayumanavan *et al.* have developed a facile method for synthesizing novel cleavable block copolymers useful for producing functionalized nanoporous materials. These novel cleavable block copolymers are synthesized from homopolymers generated via atom transfer radical polymerization (ATRP), and can be readily cleaved into their constituent blocks tethered to functional handles (see figure below) under very mild reaction conditions. Upon cleaving and washing with a solvent selective for a minor constituent block after microphase separation, nanoporous materials containing functional handles in the nanopores can be generated. Further nanopore functionalization can produce a variety of polymer-based composite materials.

#### ADVANTAGES

- Facile synthesis and high-fidelity cleavage provide access to a wide variety of block copolymers cleavable under mild conditions.
- Cleavage and minor block removal can be done using organic or inorganic solvents.
- Highly reactive functional handles provide versatility for nanopore functionalization.
- Functionalized nanoporous templates or nanostructured composites can be produced for various end-use applications.



#### APPLICATIONS

- **Separation Media:** Functional handles in the nanopores can be easily modified with ionic moieties or hydrophobic/hydrophilic functionalities to obtain highly effective nanoporous membranes for separation of organic or biomolecular compounds.
- **Biosensor/Detection Arrays:** Functional handles can be used to immobilize proteins or other agents in the nanopores to generate functionalized templates for biosensor and detection array fabrication.
- **Solar cells:** Functional handles can be used to grow nanorods or to fabricate organic-inorganic hybrid nanomaterials useful in nanostructured solar cell applications.
- **Ultrahigh-Density Magnetic Media:** The nanoporous templates generated from the novel cleavable block copolymers can be used to produce ultrahigh-density magnetic storage/recording media.

#### ABOUT THE LEAD INVENTOR



Dr. Thayumanavan is a professor in the Department of Chemistry at the University of Massachusetts Amherst, an expert in organic and polymer chemistry. His research focuses on the design, synthesis and characterization of organic macromolecules of interest in supramolecular chemistry, materials science and biological applications. Dr. Thayumanavan leads the NSF funded Center for Fueling the Future, a new research center focused on the cutting edge of hydrogen fuel cell and solar cell science, and also co-directs MassCREST, the Massachusetts Center for Renewable Energy Science and Technology at UMass Amherst.

**BUSINESS OPPORTUNITIES:** Available for Licensing or Sponsored Research

**DOCKET:** UMA 08-11

**PATENT STATUS:** Patent Pending

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